6. The increase near the ground is due to convection, turbulence, and somewhat to topographical influence.

It is extremely gratifying to know that such an excellently equipped station is being maintained, and future reports on the results of the various other branches of the work will be awaited with the greatest interest.—*L. T. S.*

THE ROYAL METEOROLOGICAL SOCIETY'S "RAINFALL ATLAS OF THE BRITISH ISLES"

The extent to which amateurs with an interest in the weather can supplement, or, indeed, make possible, a scientific work of great importance, is illustrated by this atlas. The British Rainfall Organization is composed of such amateurs. In the course of its long history it has enlisted the cooperation of some 10,000 voluntary observers. Its records placed at the disposal of the committee of the Royal Meteorological Society directing the preparation of the atlas the accumulated data from some 3,000 stations. This is an average of about one station to every 40 square miles, in an area three quarters the size of California.

The maps are beautifully printed in colors, and are as follows:

1. A generalized topographic map showing principal towns, the county boundaries, and chief rivers.
2. Average annual rainfall (35-year period, 1881–1915).
3. Rainfall of the wettest year (1872).
4. Rainfall of the driest year (1887).
5. Annual rainfall as percentage of the average of 1881–1915, for each year from 1868 to 1923, inclusive.
6. Twelve monthly rainfall maps.

Dr. Hugh Robert Mill contributes a very full introduction, describing the history of the British Rainfall Organization, briefly summarizing the facts shown by the maps of rainfall distribution, and presenting several tables.

Of the tables, that showing "Areas of the different rainfall zones over the British Isles" is of particular interest, the zones being the areas between limiting isohyets. In variation of rainfall from region to region, the British Isles rival our west coast States. Fifty-three square miles, mostly along the northern shore of the Thames estuary, have annually less than 20 inches, while 22 square miles of mountain country in northern Wales, northern England, and western Scotland average over 150 inches annually. Slightly more than 1,000 square miles have over 100 inches, and roughly one-fourth of the total area of the British Isles have 30 inches or less.

A table of percentage variations of annual rainfall, 1868–1923, brings out the fact that in 73 per cent of the years the generalized average rainfall for the British Isles has departed only 10 per cent or less from the normal, and in 87 per cent the departure has been 15 per cent or less.

To discuss at length the information embodied in this splendid work is quite beyond the scope of the present notice. The atlas is surely a fitting monument to the labors of Symons who organized and for many years directed the British Rainfall Organization, and to the zeal with which his successors, Wallis, Mill, and Salter have carried the work forward.—*B. M. V.*

THE RAINFALL OF FLORIDA

By GRAGG RICHARDS

[Author's abstract of a dissertation submitted to the Graduate Board of Clark University, Worcester, Mass., in partial fulfillment of the requirements for the degree of doctor of philosophy. The full text, with charts, may be consulted in the library of Clark University]

In presenting graphically the rainfall of Florida the standard methods, such as those used by Kincer for the United States, have been used. The data available for the 30-year period 1895–1924 are from 88 stations within the State, with records of 5 years or over, those covering less than the entire 30 years being adjusted to that basis.

While the range of mean annual rainfall for 30-year stations is from 57.88 inches at Pensacola to 37.19 inches at Key West, adjusted stations indicate values as extreme as 70.2 inches at Molino (16 years) and 32.1 inches at Sand Key (12 years). Except for the interior of the peninsula and the region of the keys, the mean annual rainfall is over 50 inches.

The mean of Florida as a unit, weighted by area from the chart of mean annual rainfall, is 53 inches, with 89.5% of its area receiving between 45 and 60 inches.

During the 30-year period all parts of the State, except the keys, have received over 60 inches in some years, while over 90 inches has been recorded at stations in west Florida and on the southeastern and western coasts of the peninsula. Minimum records also tend to be less on the coast than in the interior, varying, in general, from 30 to 40 inches.

For all of Florida more than half of the annual rainfall is in the half year April–September, varying from a nearly equal division in west Florida to over 70% in the southwestern part of the peninsula.

For the State as a whole, 19% of the mean annual rainfall occurs in spring, 40% in summer, 24% in autumn, and 17% in winter, but the actual distribution varies greatly with location. The southwestern coast of the peninsula receives nearly half of its precipitation in summer, while the southeast coast has heavier rainfall in autumn than summer, with over 35% of the annual amount. Extreme seasonal values vary from 48.33 inches, for New Smyrna, in an autumn (1924), to 0.17 inch, for a winter season (1906–1907), at Orlando.

All stations in Florida have a mean rainfall of not less than 6 inches in some months, the maximum varying from July in west Florida to October at points on the east coast. November is generally the month with least mean rainfall. All stations record less than 3.5 inches, as a mean, for some months, many between 1.5 and 2 inches.

New Smyrna has recorded the highest absolute maximum monthly rainfall with 39.08 inches, while Pensacola has a high record of but 18.58 inches, and Key West of but 16.99 inches. Practically all of Florida has experienced a rainless month at some time during the period, though the lowest record for Brooksville is 0.10 inch.

Mean monthly rainfall data have been used for showing rainfall types. For this purpose, Ward, showing actual means, rather than Kincer, with monthly proportions of annual rainfall, has been followed, thus giving an idea of actual amounts, as well as proportions, in a single graph.

The type for the entire State shows a July maximum and a November minimum, with a secondary minimum for March–April. For the east coast there is a distinct type, with a principal maximum in September or October and a secondary maximum in June or July. Back from this coast the early summer maximum exceeds the later one, which disappears entirely farther inland.

In classifying the distribution of rainfall by causes, the daily weather maps for the 15-year period, 1910–1924, were studied and any precipitation for each of the six stations, Pensacola, Tallahassee, Jacksonville, Eustis, Tampa, and Miami, was segregated under one of the four headings: (1) Local convection, (2) cyclonic (extratropical) storms, (3) tropical disturbances, and (4) hurricanes. These data were tabulated for each station, showing both actual values of mean monthly and seasonal precipitation and their percentage of mean annual rainfall. An unweighted arithmetic mean for the six stations was used to give some idea of distribution by causes for the State as a whole.

The proportions found were: Local convection about 33%, cyclonic storms 40%, tropical disturbances 20%, and hurricanes 6%. Cyclonic storms account for over half of the mean rainfall in west Florida, but decrease in importance to the east and south, so that at Miami they account for but 25%, with corresponding increases from the other causes.

Half the spring rainfall in southern Florida is due to cyclonic storms, while over 75% is thus rated in west Florida. In summer local convection causes about 60% of the rainfall throughout the State. Tropical disturbances, including hurricanes, bring half the autumn rainfall for the State as a whole but are more important on the east coast. Winter precipitation is over 80% cyclonic, except for Miami, where the value is 60%. From the monthly data, the period November–May may be considered that of cyclonic storms, June–August of local convection, and September–October of tropical disturbances.

Marked variations above mean values, whether annual or seasonal, may generally be traced to a few tropical disturbances, more particularly those of hurricane intensity. Light rainfall, on the other hand, is explained by lack of such tropical disturbances in the warm season or by freedom from cyclonic storms in the remainder of the year.

ANOTHER MILD WINTER—1926–27 [1]

By J. B. KINCER

The United States has experienced, in recent years, a remarkable series of mild winters. The winter of 1917–18 was severe practically everywhere east of the Rocky Mountains, but following this, year after year, the winters have been moderate to unusually mild, as a rule, and that of 1926–27, just closed, was one of the mildest of the long series. The only exception to continuous winter mildness since 1917–18 was the winter of 1919–20, which was cold in Central and Northern States east of the Mississippi River, but otherwise mostly mild. The outstanding cases of widespread mildness for the series were the winters of 1920–21, 1923–24, and 1926–27, in each of which practically every State in the Union had a warmer than normal winter.

Chart I shows the departure of mean temperature from normal for the winter of 1926–27. It indicates that local areas in the Northeast and the upper Lake region, as well as a small district in the far Northwest, were slightly cooler than normal, but at all stations in these, except one, the temperature averaged only 1° subnormal. In all other sections of the country the winter was warmer than normal, and in large areas the plus departures ranged from 3° to as much as 6°. It was especially warm in the South, and as a result vegetation at the end of the winter season was much further advanced than usual.

The broken lines on Chart I afford a comparison between the southern limit of zero temperatures reported from first-order Weather Bureau stations during the past winter with previous records. While temperatures as low as zero have occurred in comparatively recent years as far south as the east Gulf coast, during the winter of 1926–27 subzero readings were confined to practically the northern half of the country, the zero line not extending farther south than Pennsylvania, Kentucky, and Missouri. In addition, the lowest temperatures for the winter in Northern States were generally well above the previous low record, being in most cases from 10° to 25° higher. There were no previous low records broken, but the maxima equaled or exceeded the previous high record at many stations, especially in the southern half of the country. In general, the winter should be classed as moderate in about half the country, probably moderately severe locally, and mild in the other half.

Chart II shows the percentage of normal precipitation for the three winter months. In most sections west of the Rocky Mountains the period was wetter than usual, particularly in the extreme Southwest and on the western slope of the central Rocky Mountain area where some stations reported more than twice the normal amount for the season. It was also above normal in most of the Southwest and over a belt extending from the lower Missouri Valley northeastward to southern New York, while a rather restricted area in the North Central States had more than the usual amount. In the Northwest, over most of the Great Plains, and generally from the Ohio River and extreme lower Missouri Valley northward there was less than normal, with some stations reporting only about half the usual amount. Precipitation was also deficient in the immediate Gulf section and generally in the Southeast and the Atlantic Coast States.

There was more than the normal amount of snowfall for the winter in many of the high elevations of the Western States and also along the northern border of the country from the western Lake region westward, while the amounts were above normal in most places in the northern Ohio Valley area, from the central Lake region eastward, and in Atlantic coast districts from Pennsylvania northward. In addition, local areas in Virginia and North Carolina and in northern Texas and Oklahoma had somewhat more than the usual amount. Elsewhere quite generally east of the Rocky Mountains there was less than normal snowfall, the deficiencies being especially large in the Missouri and middle and upper Mississippi Valleys, the upper Ohio Valley, the South Central States, and middle Atlantic area.

[1] Reprinted from Weekly Weather and Crop Bulletin, Mar. 15, 1927.

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